



B. Rita Alevriadou, Ph.D.  
Associate Professor

Education

**Undergraduate degree (Diploma of Chemical Engineering):** Aristotle University, Thessaloniki, Greece, 1986

**Graduate degree (M.S., Chemical Engineering):** Rice University, Bioengineering & Biosciences Institute, Houston, TX, 1989

**Graduate degree (Ph.D., Chemical Engineering):** Rice University, Bioengineering & Biosciences Institute, Houston, TX, 1992



Professional Experience

**Graduate Research Assistant**, Department of Chemical Engineering, Bioengineering & Biosciences Institute, Rice University, Houston, TX; Advisor: Larry V. McIntire, Ph.D.; 1986-1992

**Postdoctoral Fellow**, Department of Molecular and Experimental Medicine, Committee on Vascular Biology, The Scripps Research Institute, La Jolla, CA; Supervisor: Zaverio M. Ruggeri, M.D.; 1992-1993

**Assistant Professor**, Department of Biomedical Engineering, The Johns Hopkins University (JHU) School of Medicine, Baltimore, MD; 1993-2003;

**Director**, Vascular Bioengineering Laboratory;  
**Joint appointment** with Department of Chemical Engineering

**Associate Professor**, Biomedical Engineering & Internal Medicine (Cardiology), The Ohio State University (OSU), Columbus, OH; 2003-present;

**Director**, Vascular Bioengineering Laboratory;  
**Member**, Davis Heart & Lung Research Institute (DHLRI);

**Affiliated Member**, Integrated Biomedical Science Graduate Program (IBGP);

**Affiliated Member**, Biophysics Graduate Program

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## Affiliations

[Member](#), Davis Heart & Lung Research Institute (DHLRI)

[Affiliated Member](#), Integrated Biomedical Science Graduate Program (IBGP)

[Affiliated Member](#), Biophysics Graduate Program

## Lab Members

**Michael P. Burns, Ph.D.**, Postdoctoral Fellow  
Production of Reactive Oxygen Species (ROS) by Cultured Vascular Endothelial Cells (ECs) due to Ischemia/Reperfusion Treatment

**Zhaosheng (John) Han, Ph.D.**, Postdoctoral Fellow  
Effect of Ischemia/Reperfusion on EC Nitric Oxide Synthase (eNOS) Activation and Expression, and Nitric Oxide (NO) Production

**Charles I. Jones III, M.S.**, Graduate Research Assistant  
Effect of Ischemia/Reperfusion on EC Antioxidant Enzyme Activities

**Guru Meenakshisundaram, MS**, BME PhD candidate,  
Graduate Research Assistant  
Role of EC Redox Status on Expression of Adhesion Molecules for Leukocytes

## Area of expertise

Vascular biology/bioengineering, endothelial cell mechanotransduction (signal transduction due to mechanical forces), oxidative stress, antioxidants, molecular mechanisms of blood cell adhesion, thrombosis, inflammation

## Research Interests

- Role of hemodynamic forces (in particular, fluid shear stress) and/or oxidative stress in vascular endothelial cell (EC) signal transduction, gene expression and protein synthesis
- Role of hemodynamic forces, blood cell receptors and plasma proteins (in particular, fibrinogen and vWF) in thrombosis (platelet adhesion/aggregation) and inflammation (leukocyte-EC adhesion)
- Design of in vitro systems to mimic the hemodynamic environment in vascular health and disease (eg. to simulate the EC dysfunction after ischemia/reperfusion or heart transplantation)



Current efforts concentrate on investigating the role of endogenous ROS in EC dysfunction following ischemia/reperfusion (I/RP) by using an in vitro experimental model that allows exposure of flow-preconditioned ECs to changes in both fluid flow (shear stress) and oxygen tension. Our data provide quantitative information on how these changes, either each one acting separately or both together (as in the case of I/RP), affect the EC redox status (ROS production and status of antioxidant enzymes), nitric oxide (NO) release and endothelial constitutive nitric oxide synthase (eNOS) phosphorylation/activation (funded by NIH).

## Teaching

### **BME 721 (Fall Quarter) "BIOLOGICAL TRANSPORT"** (co-taught with Dr. Nic Moldovan)

Course Description: It is an advanced undergraduate/graduate course. Its objective is to present engineering fundamentals and biological applications in a unified way. It covers topics in fluid mechanics, mass transport and biochemical interactions with engineering concepts motivated by biological problems.

### **BME 694 (Spring Quarter) "FUNDAMENTALS OF CELL & TISSUE ENGINEERING"** (co-taught with Dr. Doug Kniss)

Course Description: It is an introduction to cell and tissue engineering principles with emphasis on cell function (adhesion, biomaterial interactions, migration, metabolism), tissue development and growth (tissue repair, angiogenesis, inflammation), and tissue engineering approaches (tissue induction, stem cells, gene therapy).

## Recent publications/presentations

M.T. Hinds, Y.J. Park, S.A. Jones, D.P. Giddens and B.R. Alevriadou, "Local hemodynamics affect monocytic cell adhesion to a three-dimensional flow model coated with E-selectin", *J Biomech* 34:95-103, 2001.

T.C. Huang, R.E. Jordan, R.R. Hantgan and B.R. Alevriadou, "Differential effects of c7E3 Fab on thrombus formation and rt-PA-mediated thrombolysis under flow conditions", *Thromb Res* 102 (5):411-25, 2001.

L.H. Yeh, A.M. Kinsey, S. Chatterjee and B.R. Alevriadou, "Lactosylceramide mediates shear-induced endothelial superoxide production and intercellular adhesion molecule-1 expression", *J Vasc Res* 38(6):551-9, 2001.

D.M. Wootton, A.S. Popel and B.R. Alevriadou, "An experimental and theoretical study on the dissolution of mural fibrin clots by tissue-type plasminogen activator", *Biotechnol Bioeng* 77(4):405-19, 2002.

C.K.D. Ng, S.S. Deshpande, K. Irani and B.R. Alevriadou, "Adhesion of flowing monocytes to hypoxia/reoxygenation-

exposed endothelial cells: role of Rac1, ROS and VCAM-1", *Am J Physiol* 283:C93-C102, 2002.

K.V. Vijayan, T.C. Huang, Y. Liu, A. Bernardo, J.F. Dong, P.J. Goldschmidt-Clermont, B.R. Alevriadou and P.F. Bray, "Shear stress augments the enhanced adhesive phenotype of cells expressing the Pro33 isoform of integrin  $\beta_3$ ", *FEBS Lett* 540:41-6, 2003.

B.R. Alevriadou, "CAMs and Rho small GTPases: gatekeepers for leukocyte transendothelial migration. Focus on: VCAM-1-mediated Rac signaling controls endothelial cell-cell contacts and leukocyte transmigration", *Am J Physiol* 285: C250-2, 2003.

J.B. Haun, W.M. Baldwin III and B.R. Alevriadou, "Clearance of complement by human vascular endothelial cells: Effects of hypoxia/reoxygenation and IL-1 $\beta$  activation", *Transpl Int* 18:475-482, 2005.

S.F. Martin, S. Chatterjee, N. Parinandi and B.R. Alevriadou, "Rac1 inhibition protects against hypoxia/reoxygenation-induced lipid peroxidation in human vascular endothelial cells", *Vascul Pharmacol*, 43(3):148-156, 2005.

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